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ABSTRACT

A study examined the questioning behavior of teachers following the reading of a basal reader story. The four teachers who served as subjects were chosen from a pool of 18 fourth grade teachers, and were selected because their classes produced the two highest and two lowest mean scores on a standardized reading comprehension measure. Each classroom was audiotaped three times and the tapes were analyzed for questioning behavior exhibited by the teacher and for student behavior when responding. A quantitative analysis of the results revealed that students in the high mean (HM) groups tended to ask fewer questions per session and fewer different questions than did low mean (LM) group students; however, the HM teachers asked more text-based questions than did LM teachers. Both HM and LM teachers incorporated reader-based questions into their lessons, with the HM teachers asking more reader-based questions that were related to the text and the LM teachers deviating from the text during such questioning. In addition, the LM teachers used more questions relating to management, student responses, and other language arts subjects than did HM teachers. Qualitative analysis of data showed that effective teacher questioning (1) focuses on depth rather than breadth of response, (2) is explicit, (3) reflects cohesiveness within multiple question asking as well as throughout the questioning period, and (4) clarifies misconceptions following incorrect responses. (FL)

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THE EFFECTS OF TEACHER EXPLANATION AND QUESTIONING PATTERNS ON FOURTH GRADE STUDENTS DURING BASAL READER INSTRUCTION

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Researchers studying effective teaching practices have investigated patterns teachers utilize while questioning students and have correlated these to either student achievement or proximal indices of student learning (Au, Note 1). Stallings and Kaskowitz (1974), in a study that examined the effectiveness of programs based on different educational theories found that significant correlations existed between achievement and a "stimulus-response-feedback" interaction pattern where the teacher provided information, asked a question about the information, and immediately responded to the students' answer with academically-related feedback. If the student answered incorrectly, the teacher guided the student to the correct response. Filby (Note 2) resported a high correlation of a similar pattern of interaction with "Academic Learning Time." The components of Academic Learning Time include allocated time, student engagement, and student success rate.

While this model has been supported, it is similar in its first steps to the concept of turntaking which has been criticized by educators. Turn-taking occurs when the teacher asks a question, choses a child to respond, the child answers, and the teacher reinforces or corrects the response (Duffy, Note 3). Duffy criticized this model because it forces the teacher to evaluate rather than aid students' ability to comprehend.

Duffy (Note 3) maintained that this model has serious consequences for pupil learning and suggested that teachers modify turn-taking such that teachers begin instructing students who fail to comprehend during turn-taking. He further suggested that more teacher explanation is necessary and delineated the following characteristics of effective explanatory behavior: 1) teachers should tell what is being taught and why it is being taught, 2) teachers should clearly tell student how to accomplish a desired task,

3) Teachers should use a greater amount of explanation talk than in a typical turn-taking interactions pattern, 4) teachers should clarify misconceptions and 5) teachers should attend to the cohesiveness of the lesson.

While Duffy's list of characteristics are valid, it would appear worthwhile to study the modification of turn-taking in a variety of contexts. Early research efforts in this area were harshly criticized for their failure to delineate effective teaching behaviors within various contexts. Researchers were critiqued for studying teachers as generalists without specifying grade level or teaching area (Dunkin and Biddle, 1974; Artley, 1969). Similarily, within the context of reading, the teacher would probably impose different behaviors depending on the context of the lesson as he/she used and modified turn-taking. Questioning of students would probably take on different characteristics during a skills lesson than it would following the reading of a story or content area text.

The purpose of this study was to examine the interactions of four teachers differentiated by the degree of their students' achievement during the questioning period following the reading of the basal story. The study is exploratory in nature and the researcher expects to generate a set of hypotheses for future study from the results, particularily in relation to quality of interaction.

METHOD

This exploratory study was performed in conjunction with another study designed to determine the effects of teaching students to generate their own questions following the reading of a basal story. In the adjunct study, three groups of students under three treatment conditions were compared. Treatment one students were taught a method of generating their own questions.

Teachers of experimental group two students were taught how to utilize probes during questioning and experimental group three students served as a control. The researcher in the exploratory study assumed that regardless of treatment, effective and ineffective teachers would be found in all groups. Early researchers in teacher effectiveness had maintained that it was the teacher that made the difference not the material or method (Bond and Dykstra, 1967; Chall and Feldman, 1966). It was also assumed that although the treatment may influence some behaviors, other behaviors deemed effective would exist in teachers who were already effective. In other words, regardless of treatment, effective teachers would behave differently than ineffective teachers.

Subjects

Eighteen teachers and 299 fourth grade students participated in the adjoining study. Students were given the reading comprehension subtest of the SRA achievement test in September, then again in May. In addition, each teacher was asked to audiotape his/her basal reading lesson during December, February, and March. An analysis of covariance was used to compare the performance of the three groups on the posttest scores with the pretest score as the concomittant variable. No significant difference in groups was found ($F = .568$, d.f. = 2, 296, n.s.). A second analysis of covariance using the pretest score as the concomitant variable was performed to compare the class means in each treatment group. No significant difference wa found within experimental group one ($F = 1.351$, d.f. = 5, 101, n.s.). Differences in experimental group two were approaching significance ($F = 2.213$, d.f. = 5, 85, $p < .06$). The means in the control group were significantly different according to this analyses ($F = 2.376$, d.f. = 5, 93, $p < .045$). Following this analysis, the adjusted means by classroom were

rank ordered from the lowest to the highest. Fischer's LSD procedure was utilized to determine the adjusted means between which significant differences existed. The top five classroom means in the distribution were significantly different from the bottom four classroom means according to this procedure. Since the procedure is liberal in nature, the researcher chose to examine interactions between the teachers and pupils whose class had the two highest means and the two lowest means. It may be noted that the teachers with the highest means participated in experimental group two. One teacher selected due to her low mean class score was part of the control group while the other was part of the experimental two group.

Transcription of Lessons

Three audiotapes were requested during the study. Each tape was transcribed and recorded in sequence on GRIP (Mangano, 1983) using a modified approach. Questions were categorized as 1) vocabulary, 2) text-based, 3) reader-based a) related to the gist of story or b) unrelated or minimally related to gist of story, and 4) other: a) management, b) questioning students about the nature of their response, e.g. Do you believe that?, c) questions related to other language arts. Answers were categorized as 1) correct or accepted, 2) wrong, 3) incomplete or partially correct, 4) no response or indication of not knowing. Feedback was subdivided into 1) acknowledgement of response, e.g, all right, right, o.k. , 2) praise, e,g, very good answer, excellent, good job, and 3) negative feedback.

Probes were defined as questions that guided students to correct responses or added depth to the response of a correct response. Probes were classified as 1) seeking clarification, e.g. be specific, 2) increasing students' critical awareness, e.g. Why did you answer that way, 3) refocusing

students' response, e.g., if this is so how does it transfer to.....,
4) prompting of students or giving a clue to help student answer correctly,
5) asking students to add to the information that is already correct or partially correct.

Other instructional behaviors were recorded from the transcirpts. These include 1) teacher giving information a) vocabulary, b) reader-based c) text-based, d) other, 2) repetition of question or response, 3) teacher discusses the correctness of response, and 4) teacher uses examples or analogies.

Finally selected transcripts were analyzed quantitatively and qualitatively. It may be noted that originally teachers were asked to autiotape their average reading group three times. In the forecoming analysis only two tapes are analyzed. This was a result of some teachers failing to record their lessons three times. One teacher only recorded one complete basal reader lesson and only the prereading portion of the lesson on the other two, so only one transcript will be described for this teacher. The two transcripts discussed were randomly selected when three were available.

QUANTITATIVE RESULTS

For the purpose of discussion, the teacher with the low adjusted means will be referred to as the LM group and the teachers with the high adjusted means will be referred to as the HM group.

Insert Table 1

Table 1 presents the distribution of teacher and pupil behaviors categorized under question, response, feedback, and probe categories. Since the study was performed in the classroom under the district conditions

no control of time and text were possible.

Results of the analysis show that the average number of questions for the LM group was 95 while the average number of total questions for the HM group was 53. This classification includes all question types. The second analysis included a percent measure of all question types except that of restated questions or probes. The purpose of this analysis was to determine the proportion of questions used that were not meant to probe or that were not restated questions. The results show that an average of 71 percent of the LM teachers' questions across lessons were different while the average percent of different questions across lessons for the HM group was 48.

Questions were then analyzed according to the type. Vocabulary questions ranged from .04 to .13 of the question types asked during a lesson. The LM group averaged 5.5 across lessons while the HM group average 5.7 percent across lessons. All teachers utilized both text-based and reader-based questions in their lessons. The percent of text-based questions averaged .61 for the LM group and .78 for the HM group. Reader-based questions were incorporated 19 percent of the time across lessons in the LM group and 13 percent of the time across lessons in the HM group. While their inclusion during lessons reflects approximately the same proportion across groups, the LM teachers were judged to incorporate a greater percentage of reader-based questions that were unrelated or minimally-related to understanding the story. The percent of questions used in the story that were unrelated or minimally-related averaged .13 for the LM group and .04 for the HM group. Other types of questions included questions related to management, student responses (non-academic and questions related to other forms of language arts. An average of

sixteen percent of the LM teachers use of "other" questions was noted while the use of these questions averaged only .04 for the HM teachers.

Information about the accuracy of the student's response was also recorded in this study. The acceptable or correct responses has previously been correlated to student achievement and thus can be used as a proximal index of the degree of student learning (Brophy and Evertson, 1976). As can be noted in Table 1, correctness or acceptance of response averaged .76 for the LM group and .93 for the HM group. This was calculated by dividing the number of correct or accepted responses by the total number of response opportunities.

Feedback was divided into acceptance of correct response, praise of a response, and rejection of a response (negative feedback). Eighteen percent of the total responses in the LM group received acceptance and .04 received praise. The HM groups provided acceptance of a response 40 percent of the time while they generated praise for a response only two percent of the time. The analysis reveals that only one teacher (LM) provided negative feedback and this was only .02 of the response opportunities.

Differences in the teachers use of probes were also analyzed as part of the exploratory study. The HM group used a greater percent of probing questions ($\bar{x}$ = .33) than did the LM group ($\bar{x}$ = .08). It may be noted that the LM teacher who participated in the treatment group that was trained to probe used probes to a greater degree than did the other LM teacher. She also used a wider variety of probe types.

Summary of Quantitative Results

The descriptive statistics indicate that the groups differed in various respects. The HM group tended to ask less questions per session and proportionally less different questions during the lesson. However, the percent of text-based questions that the HM teachers asked was greater than that of the LM group. Both groups incorporated reader-based questions

during their lessons; however, the HM group tended to ask reader-based questions that were related to the text while the LM group tended to deviate more often from the text while asking these types of questions. Further the LM group had a greater percent of questions related to management, student responses, and other language arts subjects.

The HM group also utilized more probing questions and more feedback statement during the questioning of the basal story than did the LM group. Finally, HM students consistently produced a greater percent of correct responses in proportion to the number of response opportunities.

QUALITATIVE RESULTS

While the previous data provided insights into the distribution of questioning, accuracy of response, and use of feedback and probing, the remainder of the analysis combines some of the results as well as discusses observations that have not or cannot be quantified statistically. This section attempts to delineate behaviors that seem to be effective during the question period following the reading of a basal story.

First, effective questioning strategies tend to focus on depth of response rather than breadth. This hypothesis may be generated by combining the finding that HM teachers used a smaller proportion of different question than did LM teacher but utilized greater amounts of probing. In an alternate analysis (See Table 2) related to the types of probes that teachers used, it was noted that HM teachers asked student questions that increased their critical awareness more often than did the LM teachers. That is, they asked students why they responded as they did and how they derived their answer. Further, they asked students questions that refocused students' response (HM = 3) while LM teacher used none of these types of probes. While both groups requested that students add to information already provided, HM teachers spent a greater amount of their time doing so.

Insert Table 2

Consider the differences in transcripts between a HM teacher and a LM teacher as an example of differences in the depth of questions.

HMT: How did Wilbur feel as he stood at the door of the barn and look out?
P Like his plans were ruined.
T: Alright. Anything else?
P: Lonely
T: That's OK
P: Friendless
P: He felt down in the dumps - dreary
T: OK What makes you say that? Why do you say he felt friendless and lonely and don't tell me because the book said so. You can add some other things.

LMT: Why didn't he take it out?
P: Because he would have to take off his shoe and the sheep might be out of sight.
T: He didn't want to take the time, did he?
M: like giving up
T: Like giving up. OK. Was he determined not to give up? Is that what you are saying. He wanted the job to be kind of hard, didn't he?

It is apparent from reading the transcripts that the first teacher asked students to think about their answer while the second teacher tended to put ideas in the students' head. Are you saying ....? He didn't want to take the time, did he? The first teacher asked students why they answered as they did while the second teacher told students why she thought that they answered the way they did.

The second characteristic of effective questioning seems to be related to the extent to which teachers are vague or explicit in their questioning strategies. Au (Note 1) maintained that researchers that study linguistic concepts in the classroom have found verbal fluency to be postively related to student achievement, while vagueness was negatively related to it. It appears the same during questioning.

In a separate analysis that examined the combinations of questions and teacher talk, it was revealed that all teachers tended to rely most heavily on asking one question, then receiving a response from a student. However, all

teachers varied this technique by incorporating repetitions of questions, adding text information or experiential background, as well as asking more than one different question at a time prior to receiving one response from the student. While no pattern related to the combination of questions is evident, it seems plausible that the order and use of multiple questions with the expectation of receiving one response either adds or detracts from the clarity of the questions depending on the manner in which the questions and information are combined. This subject is in need of indepth analysis. But consider the following dialogues to make this point.

HMT: Do you suppose there's another reason why they chose Grandmother as being one for him to wrestle with? Simply because she was the weakest and they didn't want to hurt him yet frightened that he wasn't ready to wrestle with others? Any other reason for wrestling with grandmother? Do you know anything about Japanese customs and older people? Josh?
P: Older people are said to be wiser.
T: Alright, wiser. How did they act toward older people? Josh, go ahead.
P: They act toward older people like we act toward the president. Show respect for them.
T: Alright, we show respect for elder people, particularily in Japan. So they were honoring grandmother by letting her be the one to wrestle with Forever Mountain. Showing her respect by letting her do it, plus the fact that they didn't want to hurt the poor person.

LMT: Who? What? Where?
P: Chinatown

LMT: Tell how Miguel came down the, he left school didn't he? How did he leave school? He knew he had to get away from school but how did he go? What did the author say? How did he leave the school house when he was running away from school?
P: Fast

A third characteristic that seems to pertain to effective questioning is the degree to which the teacher seems to be more cohesive. Duffy (Note 3) acknowledges this as a characteristic of teacher explanation. It seems to also hold true for questioning. The HM teacher's example of complex questioning structures presented above appeared to display cohesivenes while the other two examples from LM teachers seemed to lack direction.

Cohesiveness is also displayed by the manner in which the teacher incorporates vocabulary and reader-based questions within the questioning period. Both types of questions tend to refocus students' thinking from the gist of the story to either what a particular word means or how they think. Effective questioners tend to relate this knowlede through questions in a way that is more cohesive. Consider the following transcripts.

HMT: What kind of competitor was Elle? One of our words was competitor and we used it in sentences and we talked about what it meant. Now what kind of competitor do you consider Elle?

HMT: We have two words on our vocabulary words that describe the way people might act: modest and conceited. Which one of those words would describe the wrestler at the beginning of the story?

LMT: Arroyo Hondo, good job. We didn't get arroyo on the board but what word up here do you think means the same as arroyo? Sue?
P: mesa
T: What was a mesa? Do you remember? What's a mesa, Russell?
P: flat top
T: Were the sheep heading for a flat top? You know when you come to a word that you don't understand, what should you do? Look it up. I didn't happen to put arroyo on there but I happened to put some words that mean the same. What does this word mean, Jimmy?

The noteable characteristic of these examples is that the HM teachers tended to incorporate vocabulary concepts within the framework of the story while the last transcript was an example where the teacher chose to deviate from the comprehension of the story for a period of time to discuss vocabulary. It seemed to diminish the cohesiveness of the lesson.

Another area that affected the cohesiveness of the lesson was the placement of reader-based questions that had more than one interaction for the same question. Both the LM and the HM teachers exhibited examples of this type of interaction. The HM teachers tended to place those interactions at the end of the question period while the LM teachers tended to incorporate them in the middle of other text-based questions. The implications for this is that it seemed to disrupt the students' train of thought related to the understanding of the story. On the other hand,

using reader-based questions with one or two teacher-pupil interactions seemed to enhance the pupils' understanding of the story.

A final characteristic related to effective questioning seemed to be the manner in which the teachers responded to incorrect or incomplete responses. Duffy (Note 3) discusses this in his characteristics of effective explanatory behaviors. Through this study it was difficult to determine what the most effective behaviors tended to be since the HM group had very few incorrect responses. During these times they tended to probe or tell students the answer but these occurances were so rare that conclusions should not be drawn. However, a great deal can be learned from what the LM teachers tended to do after an incorrect response. In a separate analyses, it was noted that LM teachers used two basic techniques following incorrect responses. They either restated the same question or they asked another question ignoring the incorrect or incomplete response. Consider the following transcript as an example.

LMT: Why do you think she took out the comb?
P: The old man said he would help them.
T: Alright. Does she need help right now, Jana?

Restating questions or asking students a different question provides no clarification of the misconception and tends to ignore providing feedback related to the accuracy of the response. In the above example, the student may have been led to believe that his/her response was accurate when in fact the student responded to a different question and never referred to the comb.

In summary, four characteristics that may delineate effective questioning strategies include: 1) effective questioning strategies tend to focus on depth rather than breadth of response, 2) effective questioning is explicit and precise rather than vague, 3) effective questioning reflects cohesiveness within multiple question asking as well as throughout

the questioning period, and 4) effective questioners clarify misconceptions following incorrect responses to questions.

CONCLUSIONS

While the above exploratory study has its limitations in relation to generalizability and the data that it can possibly analyze when using audiotapes, it is a starting point for research that is more tightly controlled. Further research in the way effective and ineffective teachers question following the reading of a basal story is needed. While the use of probes has been consider desireable, little has been tested to see the types of probes that seem to enhance learning. Combining variables during further study would seem to be a justifiable means to explore some of the quality of teacher behavior issues that are necessary to describe the effective teachers. Until this has been done within the context of various reading instruction situations, describing the effective teacher is limited. It seems that many aspects of instruction can be quantifiably similar while qualitatively different.

TABLE 1

Distribution of Behaviors by Question, Response, Feedback and Probe Variables

		LM TEACHERS				HM TEACHERS		
		T1:L1	T1:L2	T2:L1	T2:L2	T3:L1	T3:L2	T4:L1
QUESTIONING	Total # of questions	87	129	69	94	29	56	75
	% diferent questions (excluding probes & restated questions.	.62	.63	.74	.84	.55	.45	.45
	% vocabulary questions	.04	.06	.06	.06	.13	.04	.00
	% text-based questions	.54	.52	.73	.66	.75	.80	.79
	% reader-based questions	.19	.23	.06	.27	.12	.08	.18
	% minimally related to txt. of reader-based questions	.17	.14	.00	.20	.06	.00	.06
	% other questions	.25	.20	.16	.00	.00	.08	.03
RESPONSE	Total # answers	54	110	51	79	31	49	61
	% correct or acceptable	.80	.74	.75	.75	.94	.92	.92
	% incorrect	.17	.22	.21	.06	.00	.02	.00
	% incomplete or part. correct	.02	.04	.04	.10	.06	.04	.06
	% child doesn't know	.01	00	.00	.09	.00	.02	.02
FEEDBACK	% response acknowledged as cor.	.16	.18	.22	.15	.31	.52	.37
	% response praised	.08	.04	.03	.01	.03	.02	.01
	% response given negat. fdbk.	.00	.02	.00	.00	.00	.00	.00
PROBES	% probes (probes/ tot. quest.)	.14	.12	.04	.02	.34	.39	.25
	# different types probes used	3	4	1	1	4	4	5

TABLE 2

Teacher's Use of Probes during Lessons

	T1:L1	T1:L2	T2:L1	T2:L2	T3:L1	T3:L2	T4:L1
T. seeks clarification	7 (.08)*	3 (.02)	0 (.00)	2 (.02)	0 (.00)	0 (.00)	2 (.03)
T. increases critical awareness	0 (.00)	3 (.02)	0 (.00)	0 (.00)	0 (.00)	7 (.13)	2 (.03)
T. refocuses student's response	0 (.00)	0 (.00)	0 (.00)	0 (.00)	0 (.00)	2 (.04)	1 (.01)
T. prompts	4 (.05)	5 (.04)	0 (.00)	0 (.00)	4 (.14)	4 (.07	5 (.07)
T. asks student to add to information	1 (.01)	5 (.04)	3 (.04)	0 (.00)	6 (.21)	9 (.16)	9 (.12)

* percent score reflects probe type/ total number of questions

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